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ABSTRACT

This paper describes the design, implementation, and application of interactive World Wide Web-based learning, based on several business courses taught at Bronx Community College/The City University of New York. The first section summarizes ways the Web was used, including managing the dissemination of course materials, instructor/student communication, assignments and tests, making material covered in the classroom available, accessing information sources on the Web, and students' Web publishing. The next section describes Internet projects that focus on Web searching, job search with the Web, electronic mail, listservs, and graphics. The third section presents the steps in creating and publishing a Web page, including research proposal (needs assessment), interface design, project production (implementation), refinement and maintenance, FTP (file transfer protocol), presentation, and evaluation. (AEF)

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Research Paper: Curriculum and Instructional Strategies

Web-Based Instruction: Business Courses

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Web-Based Instruction: Design, Implementation, and Application

The Internet provides great potential to improve learning and teaching, as well as provides unlimited resources of information. With the Internet's wealth of reading material and with the discussion on listservs and newsgroups, students have much to critique, analyze, argue, and summarize. E-mail and Web-based discussion forums provide an ideal medium for students to write easily and frequently and to receive immediate feedback on what they have written.

At Bronx Community College/The City University of New York I have designed and developed a department Web page, faculty development and training Web page, and all course materials on the Web, which includes syllabus, interesting links in my content area, and a World Wide Web exploration assignment for several business courses I teach. This paper will focus on the design, implementation, and application of interactive Web-based learning.

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How Did I Use the Web?

- Managing the *dissemination* of course materials—Include such items as course topics to be covered, my office hours, textbook information, course objectives, and grading policies.
- Instructor/student *communication*—Provide access to my e-mail link and to discussion groups that I have set-up for student-to-student communication, and create forms that my students can use to report problems or provide biographical information about themselves. Listservs are an excellent way to make class announcements, schedule changes, and due date reminders. Virtual office hours can be created using MOO software.
- Assignments and tests—Distribute assignments and tests, and provide for online completion or submission.
- Material covered in the classroom—Make handouts available either as Web pages or as downloadable files.
- Access to Information resources on the World Wide Web—Provide links to other pages which cover information on the topic, similar courses that may also be available on the Web and other on-campus resources that may help my students complete the course.
- Students' Web publishing

Internet and Web Publishing Projects

Part I. Internet Projects

Introduction. The Internet portion of the course began with an introduction to accessing the Internet. This included e-mail, research using a menu-based program (Gopher), research using search tools, and signing on to a listserv.

Internet Projects. The purpose of these Web assignments are: to encourage students to take an active role in the learning process, and to expose students to the Internet and technology skills they will find necessary in today's work world. By integrating technology into the classroom, students are encouraged to be active participants in the creation of knowledge rather than passive reactors to instruction. Technology and the Web assignments involve students in the learning process and motivates them to take more responsibility for their education. Nearly all course assignments were to be handed in electronically.

Project 1. Web Search

Use both a spider-based (e.g., Lycos) and a list-based (e.g., Yahoo!) search engine to research a topic of interest to you. Which search engine delivered the best (most useful) information? Find one article on the following topics:

- Copyright and privacy

- Data security
- Distance education
- Web-based teaching/learning
- Web-page design

Write a one-page paper outlining what you found.

Project 2. Job Search with the World Wide Web

Surf the Web and find three jobs that might be of interest to you after graduation. You can try any of the following URLs, or use other sites of your choice.

JobWeb	http://www.jobweb.org
NY State Dept. of Labor	http://www.labor.state.ny.us
Yahoo! NY Classifieds	http://classifieds.ny.yahoo.com/ny
Online Career Center	http://www.occ.com
Career Path	http://www.careerpath.com
Federal Jobs	http://www.fedworld.gov/jobs/jobsearch.html
Nationwide Job Network	http://www.nationjob.com
U.S. Dept. of Labor-America's Job Bank	http://www.ajb.dni.us.com
Jobcenter	http://www.jobcenter.com

Project 3. Electronic Mail

It is time to communicate electronically. I want you to use your e-mail regularly (as often as you read your regular mail). Search the Web and find three interesting sites which are related to our course. Send me e-mail and cc to one of your classmates. Before you begin typing, spend some time organizing your thoughts and thinking about what you want to say. After you have typed the memo into the e-mail system, reread it with a critical eye and edit it for clarity. Please keep the message brief, but include your name. In a day or two I will send you a reply.

Project 4. Listservs

Find a listserv list on the Internet that is about a topic which you are interested in. Subscribe to that list. Submit a short report on your experiences.

Project 5. Graphics

5a. Locate a copyright-free graphic that can be used in a Web page you will create.

5b. Use a scanner or QuickCam camera to create images that can be used in a Web page you will create.

Part II. Creating and Publishing a Web Page

Project 1. Research/Proposal (Needs Assessment)

Plan and storyboard your entire page-development process on paper. You are required to write a proposal of what you are going to produce. You are expected to conduct necessary investigation and collection of materials, digitize the information, and produce a report in a multimedia format.

The proposal should include:

- What is the title of your Web page?
- What is the purpose of the Web page?
- Who is your target audience? Develop the Web site by analyzing the audience because they possess different levels of motivation and understanding and different learning styles. In addition, pay attention to the learner's computer literacy which will range from none to extensive.
- Consider resources needed to meet the goals and objectives.

Project 2. Interface Design

Based on the proposal, organize your research using index cards. This is the phase when you determine the graphical user interface and the overall visual look of the project. Completely think through your ideas before using HTML. You are encouraged to revise and edit the index cards. Attention should be paid to design, layout, visual elements, and relevant links.

- Where you are starting from (home page)?
    1. Create a hierarchical map of your site, starting with your home page.
    2. Organize the information into major categories and subcategories. You need to divide the project into smaller components.
    3. Balance is the key to making decisions about the number of levels a site should contain and what information should appear at each level.
    4. Create table of contents
- Where you want to go (information you need to locate)?
    1. Navigation: Decide how buttons and menus will help the viewer navigate their projects.
    2. Decide how the screens will be connected—linking.
    3. Label navigation buttons.

- The roads that may take you there (hotspots/links)
    1. Links to relevant and appropriate resources.
    2. What are the link selection criteria?
- Interactivity: It should be user-friendly, making accommodations for all levels of computer user. It should allow input of information. Some components of interactive pages are forms (student information form), guestbooks, and Javascripts.
- Consistency
    1. Grouping sections of closely related information visually with horizontal lines.
    2. Providing the page's URL, information heading for each page, information about yourself such as your name and e-mail address (source of information), and information about when the page was last updated.
    3. Consistency in the placement of buttons.
    4. Consistency in the color, backgrounds, and style of text.
    5. Develop repeated page elements (e.g., banners, icons).
- Keep it simple
    1. Frames and image maps were avoided since most browsers, other than Netscape 2.0 and higher, and Internet Explorer 3.0 and higher, do not support frames.
    2. Emphasize content over form.
- Coordinated graphics
    1. Keep graphic file sizes small. Keep a graphic image between 35K and 50K. Large graphics can delay a Web page in loading. You can also provide thumbnails for larger images.
    2. Graphics should contribute to the content. Some graphics may detract the reader from the content of the page.
    3. Keep graphics to a minimum because many users have older computer hardware with low speed modems.

Project 3. Project Production (Implementation)

The Web page must contain the following:

- information about yourself such as your name and e-mail address

- information that you have gathered, edited, written, designed, or otherwise created that offers a service to other members of the Internet community, for example, a collection of links related to a hobby of yours, text that offers helpful information, and news
- link to our course home page
- link to an ordered list of three favorite Web sites that are related to business use of Internet
- a background color and design

Plan out the sequence, the text, the sound, the picture, and the snap shot you want to add to each screen. The assignment is due in the form of .html files on a disk. You will be graded on your design of the pages, graphics design, the content and use of HTML. Using Netscape, verify that the world is now able to view your home page.

Project 4. Refinement and Maintenance

At this stage, it is important to consider the hypertext capability of the Web that makes it so flexible and easy to use—both within and outside of your own Web site. You also need to consider adding graphics, sound files, movie files, and other forms of multimedia. For multimedia files, it is a good idea to tell your audience the type and size of the file so that they can decide if they want to view or listen to it. You can also use a small GIF image called a thumbnail, a link to a multimedia element that indicates graphic, sound, movie, or animation.

- Once your site is completed, ask some of your peers, and experts in both the subject matter and Web design to evaluate your page.
- Design pages that are viewable in all major browsers including Netscape and Internet Explorer, under varying conditions. Access your own Web page from different computers, with and without a modem, to see what your audience may be seeing.
- Evaluation is an on-going process, not a one-time task. Check your Web site for errors, find ways to improve it, keep information and links up-to-date, and include new subject matter and technological issues when appropriate.

Project 5. FTP

Establish a Web page on the college server using WS_FTP software.

Project 6. Presentation

You will be using the Instructor's station to show your final project to the class and discuss your creation. Your presentation should be five minutes. Submit your disk and printouts.

Project 7. Web Evaluation

You will hand in a printout of your project on a disk with your project on it. Each presentation will be evaluated by the instructor (50%) and five randomly selected students (each 10%) from the class. The evaluation will be done in the classroom. The following criteria will be used for each presentation.

Evaluation criteria: Please use the scale of 1 to 5, with 5 being the highest level for each category.

Content

1. Is the page informative and substantive?
2. Are the objectives of the program clear?

Creativity

1. Is the information presented in a new and exciting way?
2. Is the information well organized? (Appropriate graphics and visuals? Easy to navigate?)

Navigation

1. Can you tell where the buttons are and what they mean?
2. Do you know where you are in the program and how to return? (Is the navigation clear and easy?)

Overall evaluation including the completion and full functionality of the project.

Conclusion

What was most interesting about Web-based instruction was seeing how using the Internet changes the nature of teaching and learning. Instead of learning being primarily something delivered by the instructor in the classroom, it became something very student-centered. Learning took place through work in small groups, researching; using multiple resources including online research and visiting local computer stores, if necessary; and creating Web pages. After some students' initial hesitation—most had no prior Web exposure—they quickly became accustomed to using the Web as a supplement to the lectures. The Web proved beneficial to those students who missed class. Lectures and one-to-one faculty-student interaction are still important, but technology lets students take a more active role in learning. Students use computers for research, discussion, publishing, and presenting their reports. E-mail office hours increases my own personal contact with students.

Courses use a constructionist approach to learning, giving students a great deal of flexibility in the direction, scope, and purpose of course projects.

Next year, the Web-based course will be offered by the Department as an alternative to traditional print-based distance education. Students with Internet access at any place in the world will be able to receive college credit for the course.

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